MC0201

Please return to
ROSEMARY GLANVILLE
MARU: Environmental Design
Polytechnic of North London
Holloway Road, London N7 8DB

D RM

HOSPITAL TECHNICAL MEMORANDUM

COMMISSIONING OF HOSPITAL ENGINEERING SERVICES

17

MINISTRY OF HEALTH : LONDON : HER MAJESTY'S STATIONERY OFFICE
AUGUST 1967 PRICE 1s. 0d. NET

Commissioning of Hospital Engineering Services

CONTENTS

		Page No.
I	Introduction	1
II	Definitions	1
III	Commissioning manuals proposed	2
IV	Design of manuals	2
V	Commissioning personnel and commissioning stages	2
VI	Design in use	3
VII	Emergency procedures	4
VIII	Review of manuals	4

I. Introduction

1. This document has been produced by a working party of Ministry of Health and Regional Hospital Board engineers and a representative of the Hospital Engineering Research Unit with the object of assisting hospital authorities in organising commissioning procedures for engineering installations. It lists the installations for which commissioning manuals are to be issued, and describes the objects of commissioning as well as the procedures for commissioning these services from the design stage until handed over to the hospital authorities for operation and maintenance. Reference is made also to " design-in-use " procedures to follow completion and to proposals for reviewing the manuals. The latter will be published as supplements to this Technical Memorandum.

2. Although this Technical Memorandum and the manuals refer primarily to the commissioning of new installations by Regional Hospital Boards they can be applied, with appropriate modifications, by all hospital authorities and to minor work on existing systems.

3. The objects of the commissioning procedures set out in the manuals are to ensure that installations when completed comply with the design intent; that the engineer responsible for subsequent operation and maintenance is shown the correct working of the installation, and receives, before handing over, the relevant documents, service manuals and user's handbooks.

4. The procedures of the commissioning engineer will be based on the check lists contained in the appropriate commissioning manual, although many of these lists will be completed by the design engineer during site construction. A clear understanding of the respective responsibilities of the design and commissioning engineers is therefore necessary for the correct carrying out of the commissioning procedure.

II. Definitions

5. The meanings ascribed to the following terms used in the manuals are:

Board
The Regional Hospital Board.

Regional Engineer
The person appointed to that office including members of his staff.

Design Engineer
The person responsible for providing a project that satisfied the design intent.

Commissioning Engineer
The engineer appointed to commission the works and to advise the Regional Engineer, or representative of a Board of Governors or Hospital Management Committee in other cases, when the installation has been completed satisfactorily.

Site Engineer
The person appointed for supervising site works under the direction of the Design Engineer.

Group Engineer
The person appointed to that office, or his representative.

Design Intent
The functional requirements to be met by the installation and indicated in the brief to the design engineer, and the final designs and specifications produced by the design engineer in response to the brief.

Plant
Fixed machinery and engineering services.

Installations
See " Works ".

Equipment
Portable tools, instruments and machinery.

Works
All plant and work created by each project.

Service Manual
A collection in a suitable form of manufacturers' operation and maintenance instructions, valve schedules, wiring diagrams, " as fitted " drawings, spares lists and re-ordering instructions, emergency measures, design intent, commissioning records and preventive maintenance schedules as indicated in Section VI of Hospital Technical Memorandum No. 13, Planned Preventive Maintenance: A System for Engineering Plant and Services.

Planned preventive maintenance
A System of regular inspection and servicing of plant and equipment carried out in accordance with an agreed programme.

III. Commissioning manuals proposed

6. The manuals at present proposed as supplements to this Technical Memorandum are set out below:

Commissioning Manual No. 1. Air conditioning and ventilation.
Commissioning Manual No. 2. * Miscellaneous components.
Commissioning Manual No. 3. Boiler plant.
Commissioning Manual No. 4. Communication services.
Commissioning Manual No. 5. Sterilisers and disinfectors.
Commissioning Manual No. 6. Electrical installations.
Commissioning Manual No. 7. Heating.
Commissioning Manual No. 8. Kitchens.
Commissioning Manual No. 9. Laundries.
Commissioning Manual No. 10. Lifts and escalators.
Commissioning Manual No. 11. Fire service systems.
Commissioning Manual No. 12. Hot and cold water services.
Commissioning Manual No. 13. Workshops.
Commissioning Manual No. 14. Mechanical and electrical medical plant.
Commissioning Manual No. 15. Medical gases and suction systems.
Commissioning Manual No. 16. Sewerage and drainage.

* This manual deals with items common to more than one manual, for example, fans, motors, pumps etc., or items not included in any other manual.

IV. Design of manuals

7. Each manual is in loose leaf form under the following headings:

Scope
Definitions (general and technical)

.1 Preliminaries
.1.1 Design intent
.1.2 Preliminary discussions
.1.3 Document examinations
.1.4 Preliminary general examinations
.2 Examinations before testing
.3 Examinations during testing
.4 Completion and handing over
.5 Appendices

8. Essentially each manual consists of check lists of recommended examinations and tests. Space is provided for confirmation of action taken; test and performance logs and charts are included where appropriate.

9. The check lists also indicate the documents to be transferred to the Group Engineer when the works are accepted for operation and maintenance.

10. The loose leaf arrangement makes it possible to compile a master folder for the project. This will include relevant sheets from the " Miscellaneous Components " manual as listed in the index of the commissioning manual for each service.

11. The code numbering system employed in the manuals is—manual number/section number/item number. Therefore, 1.2.4 refers to item 4 in section 2 of the Air Conditioning and Ventilation Manual.

12. The issue number and date of issue is indicated on each sheet, as the review of the manual may result in the amendment and re-issue of some sheets without effect on the rest of the manual. Sheets when replaced will indicate a revised issue number and date of issue.

V. Commissioning personnel and commissioning stages

General

13. The manuals indicate which tests should be performed but not how these should be carried out. It is suggested that regions might co-operate to make use of existing expertise in commissioning and of instruments available for this purpose, until there exists a more general knowledge of the techniques required.

14. The two chief requirements of the commissioning process are the carrying out of examinations and tests before and during site construction, and confirmation that the integrated system, when completed, meets the design intent. The procedures to be applied and the responsibilities of the professional and technical staff are summarised as follows:

Pre-commissioning stages

(a) ***Design***

15. The design engineer should use the check lists covering services in the project to ensure that the necessary provisions for commissioning are incorporated in the design and specifications and that amendments to the list are agreed with the commissioning engineer; thus the design engineer ensures that the installations when completed can be regulated and balanced, that variables can be measured and that plant can be operated and maintained efficiently.

(b) ***Commissioning programme***

16. By the time the invitation to tender stage for the project has been reached the design engineer will

finalise the master commissioning manual for the commissioning engineer. He will also decide for which items tests will be witnessed at manufacturers' works and those for which test certificates will be accepted, the grade of staff acceptable as witnesses to tests during site construction and the time to be allowed for such tests.

17. Prior to the commencement of site works check lists and specifications for the works should be made available to the engineers who will be witnessing tests during construction so that they can become familiar with requirements well before tests are implemented.

18. The time required for the programme of commissioning must be taken into account in the time allowed for completion of the works, or for phases in the case of phased works. In any case major events of the commissioning process must be shown in the programme for the complete project.

Commissioning stages

(a) ***Examinations and tests during construction***

19. As site construction proceeds, the design engineer will witness examinations and tests on individual items of plant, and will provide the instruments used for tests. The results will be recorded, initialled and dated, in the space provided against each check requirement listed in the manual.

20. The commissioning engineer may query any test carried out, ask for the repetition of a test, or, by arrangement with the design engineer, undertake spot checks himself during construction or when commissioning the completed installation.

(b) ***Confirmation of design intent***

General

21. As the works near completion the commissioning engineer will be given the documents essential to his confirming that the design intent has been met, and the installation is fit for use by the client. These documents should include the draft service manual and user handbooks prepared by the design engineer. Sufficient time should be allowed for scrutiny and clearance by the commissioning engineer and Group Engineer so that the finalised documents are available when the installation is handed over.

22. The commissioning engineer in conjunction with the design engineer will agree the dates for final commissioning and arrange for others concerned to be informed. He will arrange for any instruments he requires to be available and will satisfy himself as to their accuracy, and he should ensure that time is allowed for a demonstration of the plant to the Group Engineer.

Examinations and tests on completion of works

(a) ***Examinations before testing***

23. The commissioning engineer will apply the check lists contained in Sections 1 and 2 of the commissioning manuals.

(b) ***Examinations during testing***

24. Individual items of plant should be examined to ensure that they are in correct running order. The entire installation being commissioned should then be operated as an integrated system. It should be subjected to the performance tests and be balanced and regulated as appropriate and as listed in Section 3 of the manual. Where appendices (Section 5) are available these should be completed.

25. The commissioning engineer will forward the completed commissioning documents to the Regional Engineer, accompanied by a report indicating the entries in the manual which require further action, e.g. " Exceptions " in Section 4 of the manual.

26. When it has not been possible to confirm the achievement of the design intent, as for example of a heating installation during the summer months, this should be indicated under " Exceptions " and mentioned in the report.

27. If the installation fails to meet requirements the commissioning engineer will report this together with particulars to the Regional Engineer who will decide on the action necessary to rectify faults prior to further commissioning tests.

Completion and handing over

28. The Regional Engineer will give the documents relating to the completed works to the Group Engineer for examination before the installation is handed over to the client.

29. Before the transfer of the completed works to the care of the Group Engineer, the design engineer will demonstrate to him the methods of operation, limitations and any special maintenance requirements appropriate to the installation.

VI. Design in use

30. For twelve months from the handing over of the installation to the client, arrangements should be made for the Group Engineer to keep a record in the form of a log book of the performance of the plant, in particular noting any shortcomings. At the same time as an entry is made in the log book a copy should be forwarded to the Regional Engineer to decide, in the event of defects and shortcomings, on the action to be taken by the design engineer.

31. Particular attention should be directed to exceptions from the commissioning engineer's confirmation that design intent has been met. (See para. 25).

VII. Emergency procedures

32. It should be noted that some service manuals make reference to emergency procedures for the particular installation, it being assumed that the hospital will already have a basic plan to deal with all types of emergency which may arise within the hospital.

33. It is possible that these procedures may have to be modified because of the new engineering installation. Where necessary, therefore, the final section of commissioning manuals will draw attention to the need for re-examination of emergency procedures. The commissioning engineer will assist hospital authorities in this exercise, if required.

VIII. Review of manuals

34. The manuals will be reviewed and further manuals introduced as necessary.

Ministry of Health

The following titles in this series have been issued:

Hospital Technical Memoranda

1.	Anti-static precautions: rubber, plastics and fabrics	1s 0d (1s 3d)
2.	Anti-static precautions: flooring in anaesthetising areas	1s 3d (1s 8d)
3.	Fire precautions: fish fryers	1s 0d (1s 3d)
4.	Colour code of flexible cables and cords	6d (9d)
5.	Steam boiler plant instrumentation	1s 6d (1s 9d)
6.	Protection of condensate systems: filming amines	6d (9d)
7.	Electrical services—supply and distribution	7s 6d 8s 1d)
8.	Safety code for electro-medical apparatus	3s 6d (3s 11d)
9.	Pneumatic tube communications systems	1s 6d (1s 11d)
10.	Pressure steam sterilisers	3s 0d (3s 5d)
11.	Emergency electrical services	5s 0d (5s 6d)
12.	Maintenance of buildings, plant, and equipment	3s 0d (3s 5d)
13.	Planned preventive maintenance: a system for engineering plant and services	6s 0d (6s 7d)
14.	Abatement of electrical interference	4s 0d (4s 5d)
15.	Patient/Nurse call systems	4s 6d (5s 0d)
16.	Fire precautions	4s 6d (5s 0d)
18.	Facsimile telegraphy: possible applications in district general hospitals	2s 6d (2s 11d)
19.	Facsimile telegraphy: the transmission of pathology reports within a hospital: a case study	3s 6d (3s 11d)

Price including postage shown in brackets

Binders for this series of Notes are available from Her Majesty's Stationery Office, price 6s 0d net (6s 10d).

Ministry of Health Hospital guidance publications include: Hospital Building Notes, Equipment Notes, Design Notes, Building Bulletins and Technical Memoranda.

Printed in England for Her Majesty's Stationery Office by The Campfield Press St. Albans.

SfB (94) Ab 8

UDC 725.51 : 696

© *Crown copyright* 1967

Published by
HER MAJESTY'S STATIONERY OFFICE

To be purchased from
49 High Holborn, London W.C.1
423 Oxford Street, London W.1
13A Castle Street, Edinburgh 2
109 St. Mary Street, Cardiff
Brazennose Street, Manchester 2
50 Fairfax Street, Bristol 1
35 Smallbrook, Ringway, Birmingham 5
7-11 Linenhall Street, Belfast 2
or through any bookseller

S.O. Code No. 32-509-17